

# **Call for Proposals for the Proton Radiography Facility at LANSCE**

## **Proposals are due January 15, 2010**

The Los Alamos Neutron Science Center (LANSCE) is issuing a Call for Proposals for experiments to be carried out at the Proton Radiography Facility (pRad) during Fiscal Year 2011 (October 1, 2010 – September 30, 2011) with consideration for extensions into FY2012.

All experiments—whether they are dynamic, static, classified, or unclassified—must have a corresponding proposal submitted to the Program Advisory Committee (PAC). The PAC is an advisory committee to the LANSCE User Facility Director and not a funding committee. The PAC ranking may be folded into programmatic sponsor's decision-making processes and used as a means by Laboratory management to identify potential funding.

All proposals that cover work that is continuing or are an extension of work being done this year (FY2010) must attach either a progress report, a final shot report, or a published paper on the results of that work. An overview of proton radiography capabilities can be accessed at:

<http://lansce.lanl.gov/pRad/index.shtml>.

To submit a proposal, please use the [Proposal Submission Form](#).

The proposals will be ranked on the following five criteria:

- 1) Programmatic relevance and impact.
- 2) Quality and publishability of the science being proposed (may be independent of the programmatic relevance).
- 3) Is the experiment well conceived and doable with the stated resources and requested time?
- 4) Have the requisite foundations for the proposed research been established?
- 5) How well does the proposed experiment make use of unique pRad capabilities?

Technical, operational, and safety risks should all be identified. Proposals should provide a detailed description of the experimental devices, the experimental configurations and beam time requested. Good integration with modeling and validation programs where appropriate will improve proposal ratings.

The pRad cost model normally has programmatic sponsors pay for beam time. However, approximately 10% of the run time has been set aside for compelling scientific proposals without programmatic sponsors. For this 10% of proposals, the beam time and operational support at pRad will be provided in a user facility mode. For all experiments, costs for personnel not on the pRad team and unique experimental costs, including fabrication and assembly of the experimental package, must be borne by the user.

Historically, the NNSA Science Campaigns have provided the bulk of support for experiments conducted at pRad, although other sponsors (threat reduction, engineering

campaigns, DSW, etc) have also sponsored experiments. The following are suggestions for topics that could attract programmatic support, but are not all-inclusive:

Campaign 1 (C1) experimental activities focus on complex hydrodynamics and implosion issues, including HE performance issues, and some safety issues. Of special interest are issues defining the initial conditions for boost, and on HED and burn physics issues for boost (issues not generally accessible to pRad experiments). Most material properties-specific issues are addressed in DPE or Campaign 2 (C2), but C1 does address more integrated issues such as instabilities affected by material strength and damage. The category of initial conditions for boost includes:

- 1) Selected HE performance issues, especially complex detonation and shock interactions in detonation products.
- 2) Some integrated damage and recollection issues.
- 3) Multimaterial mixing, especially instability-produced mixing.
- 4) Integrated implosion experiments.

The PHELIX driver is expected to be commissioned in 2010 (off-line) with integration and initial experiments planned for 2011. The Damage Surface Hydrodynamic experiment is the first experiment to employ PHELIX driver capability, but other applications (for FY-11 and beyond) will be considered.

C2 activities are focused on obtaining the necessary thermodynamic (equation-of-state, phase diagram, melt, etc.) and constitutive properties (spall, ejecta, yield strength, etc.) data for metals. Proposed pRad experiments involving direct measurements of phase transformations and their associated kinetics, quantification of strength, quantification of ejecta and the elucidation of damage mechanisms in metals are encouraged. C2 also focuses on the performance and safety properties of high explosives (HE); the goal of this effort is to provide accurate experimental data to feed models. We encourage proposals that would provide a new direction in the quantification of High Explosive Product EOS, that examine the mechanistic details of detonators, that characterize the hydrodynamics of reactive flow, and that use pRad for quantification of initiation studies at extremes. In both areas (metals and energetics), we encourage close coupling of theory and experiments and we would favor those proposals that have a predictive flavor that would be validated with the pRad diagnostic.

C3 has interests in 1) improving the quantitative use and interpretation of image data, particularly multi-time data, 2) work that supports the understanding of the relation between manufacturing processes and performance, and 3) work that demonstrates, develops or supports understanding the potential role of penetrating radiography for MaRIE.

C4 is interested in two specific areas of investigation related to Secondary Assessment Technologies. Ideas should connect to the issues identified in the Secondary Assessment Plan. For details, please contact the C4 Program Manager.

Proposals are solicited for future Dynamic Plutonium Experiments (DPE) to be fielded at pRad. The DPE program is looking for experimental concepts of three types:

- 1) Fundamental - where one physical mechanism is being investigated.

- 2) Mid-scale integral - where a limited number of physical mechanisms are integrated together and investigated.
- 3) Integral - where experimental results are based on the complex interaction of several physical mechanisms.

All of these types of complexity are important to our efforts to develop new, validated physics models of the dynamic response of plutonium. Ideas should connect to the requirements identified in the Ten Year DPE Plan and the Pu strategy. Copies of these documents are available upon request from the C2 Program Manager. In addition, the DPE program is interested in fostering the development of new or emerging diagnostics of relevance to DPEs.

In support of the Hydro Program Mission, pRad offers an opportunity for the development and optimization of integral experiments, complementary experiments to help resolve UGT anomalies, a test bed for advanced imager tests, and a set of experimental data that can be used for the development of enhanced image analysis. The Hydro Program encourages proposals that address these opportunities.

Unclassified proposals must be submitted to the [LANSCE User Office](#) no later than January 15, 2010, using the [Proposal Submission Form](#). Oral presentations by the proposers to the PAC will be scheduled for the first week in February 2010. The PAC will review the proposals and develop a final ranking by mid-February.

If submitting hardcopies of classified proposals, they may be sent to:

Los Alamos National Laboratory  
Mail Station 5000  
LANSCE User Office c/o MS H803  
PO Box 1663  
Los Alamos, NM 87545

Hard copies may also be hand carried to Felicia Archuleta, TA-53, Bldg. 1, Room D146.

Electronic versions of classified proposals may be emailed to [Robert Fulton](#) on the secure network.

For technical questions regarding details involved in fielding pRad experiments, contact [Frank Merrill](#).

Any other questions should be directed to the [User Office](#) or call 505-665-1010.

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